What Is Claimed Is:

~~What is claimed is:~~

1. A process for fabricating active and passive polymer-based components for use in integrated optics, incorporating the principle of gas-phase or liquid-phase diffusion, characterized in that

- at least one highly sensitive, patternable polymer resist layer is deposited onto *one* optoelectronic component;

- an etching mask is produced by exposing defined regions of the polymer resist layer;

- high-grade anisotropic deep etching is performed on the unprotected regions to transfer the etching mask to the polymer resist layer located underneath the etching mask, the exposed regions of the polymer resist layer being ablated in the vertical direction, uncovering the unexposed side surfaces of the regions protected by the etching mask;

- the unexposed polymer resist layer is filled with monomers, from its surface, through the mask of the surface masking and, from its side surfaces uncovered by the deep etching, through gas-phase or liquid-phase diffusion, with the application of heat, the monomers being suited for filling the already existing pattern of the polymer, for breaking it up and for repatterning it, it being possible to selectively change the optical properties of the optoelectronic component as a function of the type of monomers used for the doping , as well as of the temperature and application time.

2. The process according to Claim 1, characterized in that the material swelling inevitably occurring during the diffusion process is selectively controlled through the diffusion time and the process temperature, until pattern inaccuracies have again been compensated, the surface roughness caused by the effectiveness of the surface tension in the material being simultaneously smoothed.

3. The process according to Claim 1, characterized in that, vacuum or air is used at standard pressure in the interstices of the patterned polymer to adjust a difference in

refractive indices of >1.5 with respect to the patterns in the filled polymer, producing optical elements of extremely high quality and having few periods and, thus, few refracting surfaces.

4. The process according to Claim 1, characterized in that the polymer pattern filled with nonlinear material is surrounded by electrical electrodes, and in that the optical properties of the polymer pattern are influenced by controlling the electrical field applied between the electrical electrodes.

5. The process according to Claim 1, characterized in that the polymer pattern filled with nonlinearly optical material is connected to waveguides, through which light is injected into the polymer pattern, and the optical properties of the polymer pattern are influenced by varying the injected light.

6. The process according to Claim 1, characterized in that the etching mask is produced by exposing defined regions of the polymer resist layer in conjunction with silylation of the unexposed regions of the polymer resist layer and, subsequent to the silylation, the etching mask is smoothed at its edges by an isotropic etching attack using an agent which attacks the silicon oxide of the etching mask.